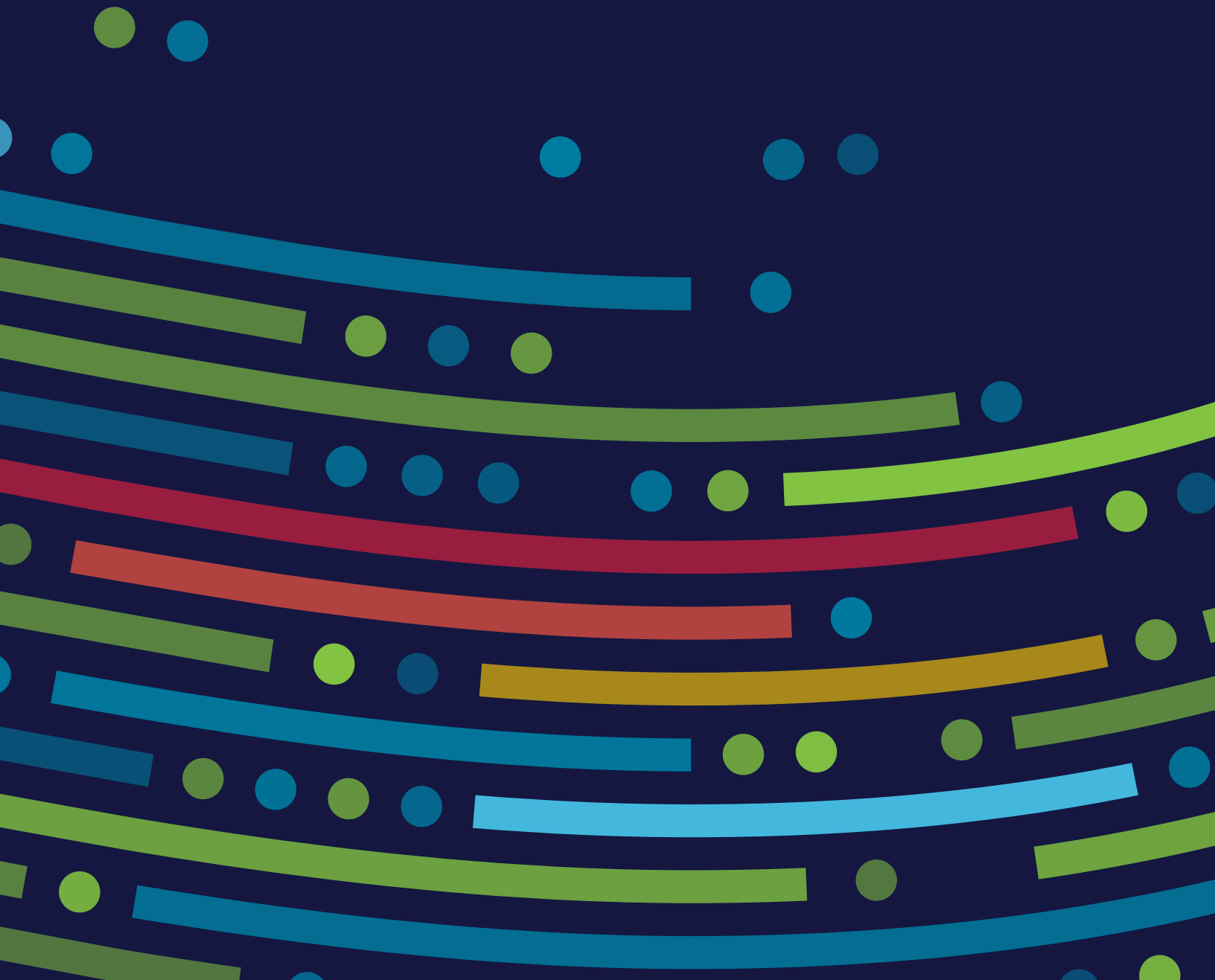




UNIVERSITY OF TORONTO
FACULTY OF KINESIOLOGY & PHYSICAL EDUCATION

FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION

ANNUAL RESEARCH REPORT 2022–2023



WELCOME



Professor Gretchen Kerr, dean



Professor Tim Welsh,
associate dean of research

Welcome to the 2022–23 Research Report of the Faculty of Kinesiology and Physical Education. We are pleased to share an overview of the innovative and impactful research led by our faculty members across the wide variety of fields that comprise the academic discipline of kinesiology.

As you will see, our faculty’s research spans the continuum of cell to society, from puddle to podium, and from children with special needs to elite athletes. Here are just a few of the highlights from this remarkable year.

From investigating why some athletes are injury prone and whether restricting blood flow to limbs can boost athlete performance to exploring how activity “snacks” following meals may help maintain muscle mass and examining the health challenges experienced by breast cancer survivors, our researchers have been making important contributions to one of the key tenets of the Faculty’s Academic Plan: elevating health and well-being.

They studied the experiences of girls who play on mixed-gender sports teams and explored the experiences of students and coaches with Special Olympics Unified Sports, contributing to another important tenet of the Academic Plan: igniting transformative inclusivity.

The Faculty’s new and renovated research spaces helped foster innovation, discovery and achievement while also activating partnerships and collaborations – two more tenets of the Academic Plan.

Collectively, our faculty published 157 peer-reviewed articles, three books and five book chapters this year. They held over \$2 million in research funding across 38 research grants and contracts.

We are proud of our research progress, and we hope that you will enjoy perusing this annual summary.

ANNUAL RESEARCH REPORT 2022–2023

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MEET THE RESEARCH FACULTY



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Inclusive Research

Bodies of Knowledge student conference highlights importance of equity, diversity and inclusion in research practice and design

The Kinesiology and Physical Education Graduate Society (KPEGS) hosted the Bodies of Knowledge (BOK) conference in May 2022. Run by graduate students, BOK is an opportunity for early career researchers to share their research and engage in conversations relevant to the field of kinesiology, sport and physical education.

The theme of the conference was equity, diversity and inclusion (EDI) in research practice and design and featured **Nicole Kaniki**, U of T's first director of equity, diversity and inclusion in research and innovation, and **Janelle Joseph**, an assistant professor at KPE and founder of the Indigeneity, Diaspora, Equity and Anti-racism in Sport (IDEAS) Research Lab, as keynote speakers.

Kinesiology students from U of T, the University of British Columbia, Queen's University, Concordia University, York University, Western University and Brunel University presented on topics ranging from physical cultural studies to biophysical and behavioural studies.

We caught up with KPE students **Zeana Hamdonah**, **Sabrina Malouka** and **Alexandra Dojutrek** to find out more about their research and experience at the BOK conference.

Zeana Hamdonah is a PhD student at the Faculty, studying under Joseph's supervision. Her presentation focused on the experiences of young Muslim women with mosque-based women's-only physical activity programs. Hamdonah was

interested in understanding the role of space and community in influencing positive or negative sporting experiences among young Muslim women.

"Western sporting environments often assume that being religious and physically active are two incompatible things, which often results in Muslim women having to choose between their faith or participating in sports," says Hamdonah. "But religious institutions like mosques link Muslims to their communities, so they're a valuable point of reference when designing safe sporting spaces."

Her research highlights the relevance of studying the role of faith, specifically gendered Islamophobia, in sport science. It also resonates with the theme of the 2022 conference, which "affirmed the Faculty's commitment to equity, diversity and inclusivity across all research fields within kinesiology," says Hamdonah, who is a member of Joseph's IDEAS Research Lab.

She says presenting her research at the conference was useful for her professional development, but she also enjoyed inspiring prospective scholars with the richness of research areas that fall under kinesiology.

"I especially enjoyed the graduate student panel that I was invited to speak on, because it is always nice to connect with colleagues across labs and learn more about how they apply EDI in their respective work," says Hamdonah.

“Getting exposed to the breadth of research taking place across the country was so eye-opening and makes you feel like a part of something bigger,”

– Sabrina Malouka, BKin student

Sabrina Malouka is going into her final year of undergraduate studies, working towards a Bachelor of Kinesiology (BKin) with plans to pursue graduate studies thereafter. Working under the supervision of Professor **Catherine Sabiston** at KPE’s Mental Health and Physical Activity Research Centre (MPARC), she looked at social media and exercise during the COVID-19 pandemic.

“During these past two years, the use of YouTube or TikTok videos for exercise has significantly increased,” says Malouka. “We wanted to understand the links between who we follow and why we choose to exercise, since different types of exercise motives have different implications for mental health and body image – for example, exercising to lose weight is linked with negative body image and higher anxiety and depression symptoms.”

Her research discovered that following fitness influencers on social media was motivated by appearance and fitness goals, but also by stress.

“That was an unexpected finding that would be interesting to explore further in future studies,” says Malouka, adding that the theme of the conference was of special interest to her because of her research into body image and body inclusivity. When learning about online fitness content for her research project, she noticed that the majority of fitness influencers were Caucasian, slim and able-bodied. The same trend often applied to research participants.

“Getting very specific, practical tips from the keynote speakers on how to increase diversity and inclusion throughout the research process is

something I’m very appreciative of and hope to implement in my future work,” she says. “Increasing diversity and inclusion in our field of research is imperative if we want to use online fitness content to promote physical activity without fear of harming individuals’ body image and mental health.”

Malouka says she is grateful for the opportunity to share her research at the conference and enjoyed hearing about other presenters’ research.

“Getting exposed to the breadth of research taking place across the country was so eye-opening and makes you feel like a part of something bigger,” she says.

Alexandra Dojutrek’s research explored the relationship between physical activity and cardiovascular disease in breast cancer survivors. The fourth-year BKin student explains that while women diagnosed with cancer have a 90 per cent survival rate, chemotherapy treatments, which damage the heart, and individual risk factors such as age, obesity, high blood pressure, smoking, and reduced physical activity put breast cancer survivors at an elevated risk for cardiovascular disease and cardiovascular-related events causing death.

“We know that physical activity can reduce cardiovascular disease risk, but I wanted to determine the impact of cardiorespiratory fitness, moderate-to-vigorous-intensity physical activity and sedentary time on cardiovascular risk in breast cancer survivors,” says Dojutrek, who worked on her project under the supervision of Assistant Professor **Amy Kirkham**.

Dojutrek discovered that cardiorespiratory fitness, measured as VO₂peak, which is the most oxygen a person can consume during exercise, had the strongest relationship with cardiovascular disease risk in breast cancer survivors. This means that performing exercise that increases VO₂peak in breast cancer survivors has the potential to greatly reduce their cardiovascular disease risk compared to increasing minutes of moderate-to-vigorous physical activity or decreasing hours of sedentary time.

Dojutrek says presenting her findings at the conference gave her the opportunity to think critically about her own research. The theme of the conference, in particular, resonated with her.

“The study I presented did not include ethnicity and other social factors within the results, however research in the lab going forward aims to include at least 20 per cent of participants from diverse backgrounds,” she says. “This is important to consider, as these factors may affect how applicable the results are for people of diverse groups.”

Additionally, Dojutrek says she really enjoyed hearing about projects from different topic areas.

“Since my research is focused in the biophysical area, I appreciated the different perspectives and research methods in other areas like physical culture and the keynote presentations,” she says. “It is always helpful to get new perspectives to better your own research.”

By Jelena Damjanovic
Published online 20/05/2022



THE APEX

**U OF T AND SINAI HEALTH ANNOUNCE NEW GIFT
FROM LARRY AND JUDY TANENBAUM TO ESTABLISH
THE TANENBAUM INSTITUTE FOR SCIENCE IN SPORT**

The generous investment of Larry and Judy Tanenbaum and the Tanenbaum Family Foundation will lead to advances in the science and medicine of sport, improving health care for high performance athletes in the Greater Toronto Area and beyond.

Established through a generous \$20-million gift from the Larry and Judy Tanenbaum Family Foundation, the Tanenbaum Institute for Science in Sport (TISS) at the University of Toronto will be a global centre of excellence for high performance sport science and sports medicine.


TISS will yield new knowledge at the intersection of research and practice, translating discoveries into innovations that dramatically impact health and performance across all athlete populations.

TISS will bring together the leading sport science research of the Faculty of Kinesiology and Physical Education, the sports medicine research expertise of the Temerty Faculty of Medicine, and the renowned clinical and research leadership of the Dovigi Orthopaedic Sports Medicine Clinic and the Lunenfeld-Tanenbaum Research Institute at Sinai Health.

“Today marks a monumental step forward in support of Canadian high performance athletics – one that will lead to improved athlete performance, safety and well-being,” said U of T President Meric Gertler. “Thanks to the extraordinary generosity of Larry and Judy Tanenbaum, the Tanenbaum Institute for Science in Sport will become one of the world’s leading centres in the field. And the Institute will be truly unique, combining the strengths of U of T’s top-ranked research programs and sports medicine departments with leading clinical care centres at Sinai Health, all in the heart of one of the world’s most celebrated sporting cities.”

The Tanenbaum Institute for Science in Sport will transform athlete health and well-being

TISS will help model and predict athlete performance and improve health outcomes based on a wealth of data from across the Greater Toronto Area. This new knowledge will support high performance athletes across a spectrum that includes world-class professional, non-professional and para athletes, including athletes from diverse and underrepresented communities, as well as athletes striving for high performance optimization in recreational sports.



“We are so excited to be joining in this important research enterprise by pooling together our academic research, large and diverse athlete base and training facilities with the world-class clinicians of Sinai Health.”

The Institute will catalyze U of T and Sinai Health’s sport science and sports medicine expertise, generating novel insights and innovative technologies and interventions that will improve athlete performance, health, safety and well-being; reduce risk of injury; accelerate and optimize recovery and rehabilitation; and advance high performance sport in a manner that is safe, welcoming, inclusive and accessible to all.

To this end, TISS will work in partnership with sports clinics, associations and organizations, including Maple Leaf Sports and Entertainment (MLSE) and its teams: the Toronto Maple Leafs, the Toronto Raptors, Toronto FC and the Toronto Argonauts, as well as the Toronto Marlies, Raptors 905 and Toronto FC II.

“I truly believe that sport unites us, inspires us and offers all people a path towards becoming their best selves,” said Larry Tanenbaum, chair of the Tanenbaum Family Foundation and MLSE. “The Tanenbaum Institute will bring together sports medicine, sport science and data science to encourage athletic engagement, enhance performance and accelerate recovery and rehabilitation. I’m proud to join with U of T and Sinai Health in transforming athlete health and well-being.”

Support for innovative research in sports medicine

Larry and Judy Tanenbaum’s gift will be combined with more than \$20 million in additional support from U of T and Sinai Health. This investment will establish a Directorship and Research Acceleration Fund to support bold, innovative research across the Institute, the university and Sinai Health; create a groundbreaking new Chair in Sport Science and Data Modelling, a Chair in Musculoskeletal Regenerative Medicine, and a Professorship in Orthopaedic Sports Medicine; and provide funding for a range of cutting-edge research, innovations and clinical programs.

“The Tanenbaum Institute will enjoy a remarkable head start thanks to the amazing research and clinical sports medicine leadership we have amassed here at Sinai Health through the Dovigi Orthopaedic Sports Medicine Clinic and across U of T,” said Dr. Gary Newton, president and CEO of Sinai Health. “Establishing this landmark Institute is only the beginning. We look forward to transforming high performance sport together with our many industry, government and community partners.”

“The Tanenbaum Institute’s cutting-edge research will play a leading role in advancing high performance sport in a

manner that is safe, welcoming, inclusive and accessible to all,” said **Gretchen Kerr**, KPE’s dean. “We are so excited to be joining in this important research enterprise by pooling together our academic research, large and diverse athlete base and training facilities with the world-class clinicians of Sinai Health.”

“We’re incredibly excited by the potential for the Tanenbaum Institute to transform sports medicine across Canada and to train future generations of sport science and sports medicine leaders,” said Trevor Young, dean of the Temerty Faculty of Medicine at U of T. “By bringing together so many disciplines, the Tanenbaum Institute will make breakthrough big data-driven findings that will lead to better athlete health, safety and performance.”

TISS combines a diverse array of sport science and sports medicine talent. The Institute’s research and clinical foci will include mild traumatic brain injuries, orthopaedics, regenerative medicine, biomechanics, wearable physiological and training monitoring technologies, technologies in parasport, mathematical and statistical modelling applied to individual athlete and team analytics, nutrition, individual and team psychology and health, exercise physiology and more.

An impressive philanthropic legacy

This latest gift from the Tanenbaum Family Foundation builds on an impressive philanthropic legacy at U of T, Sinai Health and beyond. Larry and Judy Tanenbaum and the Tanenbaum family have been long-time supporters of U of T. In 2014, they helped establish the Anne Tanenbaum Centre for Jewish Studies at the Faculty of Arts and Science, one of North America’s leading programs of its kind. They have also established several scholarships in support of student athletes.

At Sinai Health, Larry and Judy Tanenbaum have made several transformative investments. In 2013, they gave \$35 million to the then renamed Lunenfeld-Tanenbaum Research Institute, accelerating Sinai Health’s work in biomedical research.

Larry and Judy Tanenbaum have also made major gifts in support of cutting-edge physical and mental health research across Canada. Their generosity led to the creation of the Tanenbaum Open Science Institute at McGill University and the Tanenbaum Centre for Pharmacogenetics at the Centre for Addiction and Mental Health.

By Advancement Staff Published online 31/05/2022

CROWNING ACHIEVEMENT

Janelle Joseph elected to Royal Society of Canada's College of New Scholars, Artists and Scientists



Janelle Joseph joins an exclusive group of Canadian scholars, artists and scientists who have demonstrated excellence and extraordinary productivity at an early stage in their careers, and whose perspectives and expertise will strengthen the College's mission of harnessing interdisciplinary approaches to generate ideas and solutions for the challenges facing Canada – and the world.

“It is the pinnacle of my career to be elected to such an esteemed group,” says Joseph. “I first heard of the Royal Society of Canada and its scholars who were doing such incredible empirical and theoretical work when I joined U of T as a faculty member.

“Many of the researchers I draw on in relation to Black Studies in Canada, such as Katherine McKittrick, George Dei and Carl E. James, are fellows of the Society, so now that I am among them, I feel truly humbled and honoured.”

Joseph's research explores the intersection of race, education and physical cultures such as sport, dance, martial arts and land-based play – the concept of learning on and from the land built around the Indigenous connection with the land. An award-winning scholar (she won the 2020 Connaught New Researcher Award), her research is actively changing our understanding of power structures in Canada and our notions of who can access, generate and advance knowledge about the moving body in various contexts.

“I am compelled to partner with racialized communities because not enough attention is given to the social and political implications of white

privilege, colonialism, ethics and Indigeneity in sport research, especially in Canada,” she says.

Joseph uses critical race theory to study racialized people's physical culture experiences.

“I believe we need to counter the erasure of our complex stories spanning race, gender, disability and class,” she says. “This is essential because when our stories are not told, we remain invisible to the broader public, and collective efforts towards increasing belonging will continue to be fraught.

“In short, my research preserves human life and dignity.”

Joseph provides critical assessments of how physical cultures could – or already do – contribute to the flourishing of racialized peoples.

“What I am hearing directly from research participants are remarkable stories not only of holistic health promotion through diverse movement practices but also of perseverance in the face of constant systemic barriers to equity.”

She draws inspiration from key stakeholders such as athletes, coaches, policy makers, program funders and post-secondary sport administrators who are asking, “What could we do differently to improve diversity, equity and inclusion?”

“My research ensures everyone bears witness to racialized experiences,” she says. “And that changes lives.”

Joseph is looking forward to the opportunities provided by the Royal Society of Canada to collaborate with influential thinkers across the nation “and have a real impact on national policy.

“Being in a room with people who are advancing knowledge in their respective domains will be life-changing for my scholarship and for millions of Canadians whose communities our research will touch,” she says.

Joseph is the founder and director of KPE's Indigeneity, Diaspora, Equity and Anti-racism in Sport (IDEAS) Research Lab and has authored/co-edited three books related to race, sport, education and Black communities in Canada.

“I am really proud of my book *Sport in the Black Atlantic* based on nearly two years of ethnographic research,” she says.

In the book, she documents the cross-border community-making experiences of older Black Caribbean-Canadians, examining many sociological themes, including diaspora, space, racism, gender and nationalism.

“I take lessons from the pleasures and challenges of this field research into my current studies and my graduate student supervision at KPE,” she says. “There are also interesting connections between the older generation of Black cricket players I studied over a decade ago and some of their children who are current coaches and administrators in Ontario University Athletics.”

In 2021, Joseph completed the Ontario University Athletics Anti-racism Report, the largest study of anti-racism in university sport in Canada.

“I'm really proud of the ways the report has been taken up by the athletic directors in the province and across U SPORTS in Canada, making changes to their staffing and training processes,” she says. “I'm most happy when I see my research making change in the world.”

By Jelena Damjanovic
Published in *Pursuit*, Summer 2023

DOUBLE JEOPARDY

Canadian breast cancer mortality rates drop, as side effect risks grow



It was the information she couldn't find that led **Amy Kirkham**, an assistant professor in the Faculty, to her latest discovery.

Asked by the Canadian Women's Heart Health Alliance to co-author a scientific statement paper in 2020 on the state of women's heart health in Canada, Kirkham – whose research is focused on preventing and treating the risk of heart disease related to breast cancer treatment – needed to know what percentage of the Canadian female population has a history of breast cancer.

But the most recent statistic she could find – one per cent – was from 2007. “Nearly 15 years had passed, and I could not find a more recent citation about the prevalence of breast cancer survivors in Canada,” says Kirkham. “Breast cancer mortality rates had continued to improve 26 per cent over this time period, so I suspected that this number was no longer accurate.”

So, in collaboration with Katarzyna Jerzak, a medical oncologist at Sunnybrook Odette Cancer Centre and assistant professor in the Department of Medicine in U of T's Temerty Faculty of Medicine, Kirkham embarked on a new study that would determine an up-to-date estimate of the prevalence of breast cancer survivors in Canada in 2022 using the Canadian Cancer Society's annual cancer statistic reports.

The study, published in the *Journal of the National Comprehensive Cancer Network*, found that in the 15-year span from 2007 to 2021, there were 370,756 patients (2.1 per cent of the adult female population in Canada in 2022) diagnosed with breast cancer, and 86 per cent of these women would have survived breast cancer by 2022.

“This indicates that the prevalence of breast cancer survivors in the Canadian female population has doubled and that there are 2.5 times more survivors since the last estimate in 2007,” says Kirkham.

The prior estimate did not include the age group of survivors, but according to the new estimate provided by Kirkham and Jerzak, breast cancer survivors represent one per cent of Canadian women in the typical working and/or child-raising age group (20 to 64 years) and 5.4 per cent of senior Canadian women (65 years and older).

But it's not all good news.

Many of the treatments that have improved breast cancer mortality rates also cause short- and long-term side effects, which, in turn, can raise the risk of death from other causes, such as heart disease, stroke, Alzheimer's disease and liver disease, and increase other non-fatal health outcomes.

“The most common cause of death in women with breast cancer is heart disease,” Kirkham says.

Such conditions also affect overall health care costs.

To demonstrate the excess health care costs related to heart disease, Kirkham and Jerzak performed an additional analysis using Canadian data on rates of hospitalization for heart failure and their costs. They found that two per cent of the women diagnosed with breast cancer between 2007 and 2021 would likely experience heart failure hospitalization costing \$66.5 million in total. As much as 25 per cent of these costs, or \$16.5 million, were in excess of those costs that would be associated with women who did not have breast cancer.

“Given the excess health care costs, potential for reduced contributions to the workforce and reduced quality of life associated with long-term side effects and risk of excess death among breast cancer survivors, our work highlights that there is a growing segment of the population that requires services to support recovery following breast cancer treatment,” says Kirkham.

“The goal of my research lab is to develop new therapies to improve the health of women after surviving breast cancer.”

By Jelena Damjanovic
Published in *Pursuit*, Summer 2023

THE KINETIC DETECTIVE



Finding clues to why some athletes are injury prone

From each according to their abilities, to each according to their knees – and hips. **Timothy Burkhart**'s biomechanical research aims to help prevent injuries – and rehab them quickly when they do happen – in varsity athletes and the rest of us.

Growing up, as he watched NBA small forward Grant Hill go down with yet another ankle injury, or point guard Derrick Rose rip up one or the other knee again, Burkhart used to wonder: Why are some athletes injury prone?

“It always amazed me that these athletes who have unlimited resources to stay healthy – the best doctors, the best trainers – some of them just . . . couldn’t,” says Burkhart, an assistant professor of orthopaedic biomechanics in the the Faculty. “And unfortunately for some of them, that was the end of their careers. So you have to ask why. Is it some way that they’re moving? Was there a vulnerability there that didn’t get picked up?”

“We want to help athletes prolong their careers, but the goal more generally is for everyone to extend their mobility through their lifespan.” – Timothy Burkhart, assistant professor

Burkhart, who runs the Biomechanics of Orthopaedics and Sports Medicine Lab at KPE – in conjunction with the orthopaedic surgeons of the University of Toronto Orthopaedic Sports Medicine group and his team of graduate students – engages in what you might call kinetic detective work. Which parts are most likely to fail, on whom, and why?

Two components of the human chassis especially susceptible to breakdown are hips and knees. Burkhart is looking at both joints in studies now running concurrently in his lab.

The hip research is concerned with something called femoroacetabular impingement syndrome (FAIS). In this disorder, which recently derailed the career of promising Leafs goaltending prospect Ian Scott, constant stress between the femur and the pelvis causes extra bone to grow, restricting movement and generating pain. Burkhart wants to better understand why this happens and prevent it from happening so often to so many. To that end, he and his team are recruiting athletes from a variety of sports that rely on heavy hip action – such as hockey, basketball and lacrosse.

By the time an athlete reaches competitive varsity level in these sports, they’ll have performed the same movement thousands of times. A slight biomechanical hitch in their form can compound over time. It’s the kind of thing that’s traditionally been difficult to detect. But Burkhart is bringing cutting-edge tools to the job.

In the lab, athletes simulate the game moves that put such ferocious stress on the hip – sprinting and cutting, or butterfly manoeuvres. Motion-capture technology helps generate computer models that accurately estimate the forces on the hip, a non-invasive way to retrieve data that used to require intramuscular probes.

But even the best simulations can only ever get you so far – athletes just don’t move quite the same way in the lab as they do in competition. So, there’s a second dimension of Burkhart’s analysis.

“We’re really lucky that we have a markerless motion-tracking system,” he says. “We can set up cameras and videotape the athletes doing exactly what they would do while they’re playing.”

The combination of the two techniques – capturing force and movement data in the lab, and analyzing videotape of the players on the court, ice or field – produces an unprecedentedly granular level of analysis.

For reasons no one yet fully understands, FAIS hip injuries tend to be prevalent in female athletes. That’s partly why Burkhart is only recruiting women for the first trial of his hip study, which is a collaborative joint venture with Women’s College Hospital.

The same kinds of analyses are underway in the knee research – but this time with athletes of both genders.

Burkhart’s data may yield information we’ve never uncovered because he’s asking questions that have never really been asked. Are varsity athletes playing a different game than weekend warriors? Are they moving in very slightly different ways? Burkhart will compare the athletes to a control group, “our everyday healthy population that’s relatively active.”

What he learns should help both populations – on both the preventative and the rehabilitative side of things.

And that is ultimately the two-part endgame of Burkhart’s lab: early detection of vulnerabilities that could lead to injuries down the road, and evidence-based recommendations for improved rehab and return-to-activity strategies.

“We want to help athletes prolong their careers,” he says, “but the goal more generally is that everyone extends their mobility through their lifespan, and lives and plays pain-free and healthy.”

By Bruce Grierson
Published in *Pursuit*, Summer 2023



The Pressure's On

Can restricting blood flow to athletes' limbs boost performance?

Ischemic preconditioning (IPC), a technique used to prepare an organ or tissue for a lack of blood or oxygen supply, was originally developed for use in clinical settings where there is an expected lack of blood and oxygen supply – for example, during surgery or after an adverse event like a heart attack.

But could it be used to enhance athletic performance?

“IPC has been shown to have a protective effect on the body’s tissues to subsequent ischemic episodes – events where there is inadequate blood supply and, therefore, oxygen supply to a tissue or organ – that would typically cause cellular damage,” says **Liam O’Brien**, a first-year PhD student at the Faculty.

“So, when exercise researchers caught wind of it, they theorized it may be useful for enhancing exercise performance, seeing how our capacity to exercise is limited in part by the inability to deliver enough oxygen to the working muscles.”

The technique involves inflating blood pressure cuffs around one or multiple limbs at pressures that completely stop the flow of blood into or out of the limbs. The cuffs remain inflated for a brief period of about five minutes before being released for about five minutes, allowing for normal blood flow to resume through the limb. The process is repeated three to four times.

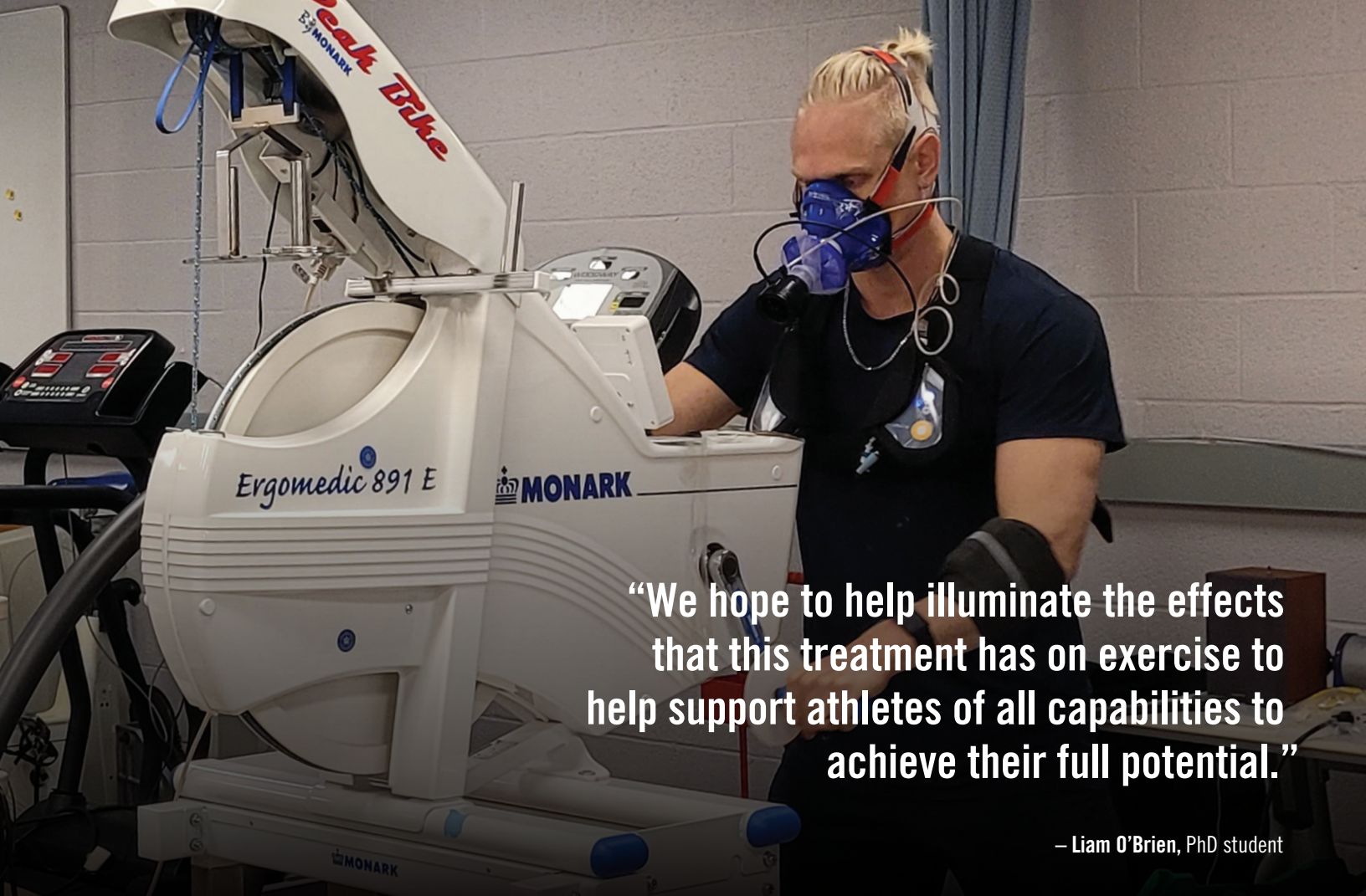
Researchers have speculated that if IPC improves the muscles’ ability to tolerate lack of oxygen supply, then perhaps this feature could be beneficial for prolonging exercise performance.

“Several studies have shown IPC to improve exercise performance, but there is little evidence as to why,” says O’Brien, who explored the question in his master’s thesis. “I wanted to fill in some of the gaps.”

While most of the studies had measured the effects of IPC on lower body exercises such as running or cycling, O’Brien was interested in investigating the effects of IPC on arm cycling exercise. He was also curious to see whether it might be useful for supramaximal intensity exercise – where the participants exercise as hard as they possibly can for the entirety of the test as opposed to pacing themselves.

“I theorized that if IPC works for upper body exercise, it may be useful for unique populations such as para-athletes or paddlers to help enhance their performance,” he says. “I was also interested in whether IPC was useful for supramaximal intensity exercise, as most of the studies had investigated IPC during endurance exercises.”

O’Brien also wanted to investigate whether IPC works due to the placebo effect, a phenomenon whereby a treatment works due to the psychological expectation that it will work, as some researchers have speculated.



“We hope to help illuminate the effects that this treatment has on exercise to help support athletes of all capabilities to achieve their full potential.”

– Liam O’Brien, PhD student

Working under the supervision of **Professor Ira Jacobs**, O’Brien recruited 18 athletic participants who completed three 45-second-long sprints using an arm cycle ergometer on separate visits to the lab. The first sprint served as a control trial, where the participants did not receive the IPC treatment, and instead lay passively for 30 minutes before exercise. During the other two visits, the participants completed their sprints after receiving either IPC (five minutes applied to both arms four times) or the placebo treatment. The placebo treatment consisted of the same protocol as the IPC trial, only at a low cuff pressure that did not interfere with their blood flow. The participants were told that the placebo treatment was also expected to enhance their performance through a similar mechanism to the high-pressure treatment despite there being no actual benefit.

“We found that the average power outputs generated by the participants in our study were significantly higher after both the IPC and placebo treatments compared to the control trial,” says O’Brien. “However, the power outputs were not different between IPC and the placebo condition.”

While this result can be seen as an indication that IPC is in fact a placebo effect, O’Brien believes it is more likely that the changes in performance were due to the order that the participants completed the trials.

“Because the arm ergometer exercise was foreign to our participants, and the participants completed the control

trial first, we believe that the second and third sprints were improved due to a learning effect rather than a performance-enhancing effect of the IPC or placebo conditions,” he says. “This was supported through our statistical analyses as well as our lack of evidence of changes in the physiological variables such as oxygen consumption, heart rate, muscle blood flow or blood chemistry.”

While the study did not find clear evidence of a performance-enhancing effect of IPC, O’Brien says that these findings help to add information to the growing research area of ischemic preconditioning and exercise performance.

“Research in this area has been active for over a decade, however much is still unknown about how IPC works in relation to exercise,” he says. “Our study is a small but important contribution towards building an improved understanding of the nuances of how IPC influences exercise performance.”

“In the end, we hope to help illuminate the effects that this treatment has on exercise to help support athletes of all capabilities to achieve their full potential.”

By Jelena Damjanovic
Published in *Pursuit*, Summer 2023



Activity “Snacks”

Interrupting prolonged sitting with periodic activity “snacks” may help maintain muscle mass and quality, according to a new study by researchers at KPE

Daniel Moore, an associate professor of muscle physiology at the Faculty, led a study that found that short bouts of activity, such as two minutes of walking or body weight sit-to-stand squats, allow the body to use more amino acids from meals to build muscle proteins. The research was published in 2022 in the *Journal of Applied Physiology*.

“We know that prolonged sedentary periods impair the body’s ability to filter sugar from the blood following a meal,” says Moore, who heads the Iovate/MuscleTech Metabolism and Sports Science Lab at KPE.

“However, breaking up this sedentary period with brief bouts of activity, such as two minutes of moderate-intensity walking or rising and lowering 15 times from a chair [i.e. body weight squats], can improve the way our body clears sugar from our meals.”

In this instance, the researchers wanted to understand whether breaking up prolonged periods of sitting, a common feature of many workplace settings, would increase the ability of our muscles to use the building blocks of protein, called amino acids, from food to help them repair or replace old or damaged proteins.

“This is critical to ensure the body has an adequate quantity and quality of muscle,” says Moore, who co-authored the study with KPE’s **Eric Williamson**, a recent PhD graduate, **Nathan Hodson**, a post-doctoral researcher, **Stephanie Estafanos**, a PhD student, **Michael Mazzulla**, a PhD graduate, **Jenna Gillen**, an assistant professor of exercise physiology at KPE, and Dinesh

Kumbhare, a scientist at the University Health Network’s Toronto Rehabilitation Institute and an associate professor in the Temerty Faculty of Medicine.

They studied 12 people (seven men, five women) across three trials for seven and a half hours each. Participants were subjected to prolonged sitting interrupted every 30 minutes by short bouts of walking or body weight squatting. The activity helped improve the efficiency of dietary amino acids used for muscle protein synthesis – the process to repair or replace old or damaged proteins.

“This is significant because prolonged periods of low muscle activity – from extended sitting, wearing a cast or bed rest – is associated with a loss of muscle mass that occurs in parallel with, or because of, an inability of our muscles to build new proteins after we eat a protein-containing meal,” says Moore.

“Our results highlight the importance of breaking up prolonged sedentary periods with brief activity snacks. We believe they also highlight that moving after we eat can make our nutrition better and could allow more dietary amino acids from smaller meals or lower quality types of protein to be used more efficiently.”

The study was supported by the Natural Sciences and Engineering Research Council of Canada and the American College of Sports Medicine, among others.

By Jelena Damjanovic
Published online 18/10/2022

ALL TOGETHER NOW

KPE study explores the experiences of girls who play on mixed sports teams



Young people who compete in sports are often organized into single-sex teams that compete separately. But what happens when youth have the opportunity to compete together?

A group of KPE researchers set out to uncover whether mixed-gender teams provide girls with more opportunities to advance and compete in sports – and if they help dispel stereotypes and contribute to mutually respectful relationships.

In a paper published in *Qualitative Research in Sport, Exercise and Health*, researchers **Melissa L. deJonge, Madison F. Vani** and **Karly Zammit** worked with Professor **Catherine Sabiston** to explore young adult women’s retrospective experiences of playing on boys’ sports teams as adolescents.

“We don’t know much about what happens when girls choose or need to play on boys’ sport teams, which is often the case in rural and remote communities where there are not enough kids to make up separate teams,” says deJonge, a PhD student at KPE. “The key focus of this study was to explore these experiences, with a special focus on how the socio-cultural environment may benefit or limit the sport experience and participation among adolescent girl athletes.”

The research team asked 11 women in their 20s who played on boys’ sports teams as adolescents to reflect on their experiences. Their reflections

show that they perceive boys’ sport environments to be superior in terms of opportunities for competition, skill development and advancement in sport. They also described having to overcome assumptions about girls’ inferiority in sport that limited their inclusion in the boys’ sport environment as adolescents.

“While it is possible that these findings reflect societal beliefs of boys’ superiority in sport, the results may also highlight inequitable opportunities for girls’ achievement and development in sport,” says Vani, a post-doctoral researcher and sessional instructor at the Faculty. “The women’s accounts provide important implications for targeting the ways sexed and gendered expectations and norms promote sport for boys while ‘Othering’ the athletic girl.”

Some of the study participants recalled engaging in behaviours that distanced themselves from their femininity.

“For example, some women described dressing to cover their bodies, not wearing makeup or nail polish and hiding their hair length,” says Zammit, who completed a Bachelor of Kinesiology at U of T.

Sabiston, who is a Canada Research Chair in Physical Activity and Mental Health and director of KPE’s Mental Health and Physical Activity Research Centre, says that the results of the study highlight the complexities of navigating sex and gender in sport as well as the unique challenges associated

with adolescent girls competing on boys’ sports teams.

“While sex-integrated sport contexts have been suggested as an avenue to encourage gender equity and inclusion in sport, further efforts in research and practice are needed to disrupt prevailing stereotypes that are limiting equitable play and opportunities for girls, particularly when competing with boys,” she says.

The researchers say that could include employing gender- and sex-inclusive behaviour and communication strategies that reduce gender-based and body-objectifying commentary, enhancing the representation of women in leadership and coaching positions and supporting the development of safe and inclusive sport environments.

“Disrupting deep-rooted assumptions of girls’ inferiority in sport requires developing and implementing strategies that target individuals – like the coaches, parents or spectators – and a systems-level approach that will address issues such as increasing resources allocated to women’s and girls’ sport to improve girls’ inclusion in male-dominated sports contexts,” Sabiston says.

This study was supported by the Social Sciences and Humanities Research Council of Canada.

By Jelena Damjanovic
Published online 22/03/2023



Out of the Lab

Bertha Rosenstadt National Undergraduate Research Conference

KPE alumna Kaleigh Pennock, currently a post-doctoral researcher at Western University, was the keynote speaker at the 23rd Annual Bertha Rosenstadt National Undergraduate Research Conference, hosted annually by the University of Toronto Faculty of Kinesiology and Physical Education.

The Faculty of Kinesiology and Physical Education hosted the 23rd Annual Bertha Rosenstadt National Undergraduate Research Conference in 2023. The multidisciplinary conference gives undergraduate kinesiology students from universities across Canada the opportunity to present literature reviews, critiques, term papers, findings from research projects or works in progress on a range of topics – from exercise physiology and biomechanics to sport psychology and the sociology of sport.

Gerome Manson, an assistant professor at Queen’s University School of Kinesiology and Health Studies – and a KPE alum – drove down to U of T with five students in tow, four from his Sensorimotor Exploration Lab at Queen’s and a guest student studying sport psychology.

“U of T always feels like home to me, especially the Faculty of Kinesiology and Physical Education,” said Manson, who completed both his undergraduate and graduate degrees at KPE. “My first academic presentation was at this conference in 2008, and it’s really cool to see my students now going to it.

“I didn’t know then that this would be the start of an academic career for me, I was just nervous. *[laughs]* It’s nice to be back to help my students work through some of the nervousness of their first presentations.”

During the conference, Manson met up with Associate Professor **Luc Tremblay**, who supervised his doctoral thesis at KPE. The two posed for pictures with students from their respective labs, prompting a tweet from Professor **Tim Welsh**, interim associate dean of research at KPE, applauding the conference for bringing together multiple generations of scientists.

In total, 86 presentations were heard from students representing U of T, Concordia, Lakehead, Laurentian, McGill, McMaster, Queen’s, Trent, University of Ottawa, University of Waterloo, University of Western Ontario and York.

Natalie Schwarz, an undergraduate student from the McGill University’s Department of Kinesiology and Physical Education, presented her research on the biomechanics of figure skaters’ arm techniques during jumps, comparing the traditional crossed-arms jump to the jump with both arms extended over the head.

“The purpose of my study was to find the most proficient jump technique,” she said. “If you’re able to rotate easier without having to exert as much effort, that’s really important for reducing some of the fatigue.

“During a competition when figure skaters have to do up to 12 or 13 jumps, it can really make a big difference.”

While her study was inconclusive, Schwarz is interested to see if expanding the research from double jumps to higher revolution jumps, like triples or quads, would give different results.

McMaster’s Anjali Bedi presented on whether a prior session of high-intensity interval training (HIIT) could be used to improve mood and inflammation levels after a night of sleep deprivation, and **Hassan Mahmood** from KPE presented his literature review on the effects of surgical and non-surgical adolescent idiopathic scoliosis (AIS) interventions on overall posture, kinetics and kinematics.



Students enjoying the presentations at the Bertha Rosenstadt National Undergraduate Research Conference.



McMaster student Anjali Bedi was presented with an award of recognition by Associate Professor Catherine Amara, associate dean of undergraduate education at KPE.

“Understanding the unique biomechanics that those with AIS engage in before and after treatment interventions can help tailor physical activity and rehabilitation interventions in a way that promotes health, wellness and inclusion for an otherwise alienated population,” said Mahmood.

“It was amazing to share my work with other students and to learn about their work,” he said. “It made me feel like we’re part of a broader, national community.”

McMaster student Anjali Bedi was presented with an award of recognition by KPE Associate Professor Catherine Amara, associate dean of undergraduate education.

Spotted in the audience were many faculty members, including KPE Associate Professor **Doug Richards**, who didn’t have any students presenting at the conference but knew many from having taught them in his courses.

“I came out today because I’m very interested in the questions these students are researching, and I wanted to show them my support,” he said.

Gerome Manson was equally enthused.

“I told my students to go listen to other students’ presentations and enjoy the full breadth of kinesiology,” he said. “This is a rare opportunity where you get to see something not only outside of our lab, but outside of our field within kinesiology.”

Kaleigh Pennock, a post-doctoral researcher at Western University who completed her PhD at KPE, closed off the conference with a keynote address on risk and responsibility in sport, and on embracing interconnected perspectives in kinesiology. Pennock, who is lab coordinator for KPE’s Indigeneity, Diaspora, Equity and Anti-racism in Sport (IDEAS) Research Lab, also works with Fast and Female to help advance opportunities for girls in sport and physical activity.

The following students walked away with awards of recognition for their conference presentations:

Anjali M. Bedi,

McMaster University, “Investigating the Impact of High-Intensity Interval Training on Deficits in Mood and Changes in Inflammation after Acute Sleep Restriction”

Sara Perfetto,

Laurentian University, “Gamified Hand Rehabilitation Using a Novel Passive Device: An Analysis of User Engagement, Motor Outcome and Functional Performance in Chronic Stroke”

Mohamed Elsayed Elghobashy,

York University, “The Effects of Interstitial Glucose on Neuromuscular Fatigue”

By Jelena Damjanovic
Published online 03/04/2023

FROM PIANOS TO EXERCISE BIKES

Inside KPE's research labs

A shiny black piano may not be the kind of instrument visitors expect to find in a research lab at the Faculty, but that is exactly what they discover – along with a transcranial direct current stimulation device and an exercise bike.

The Faculty's Training and Enhancing Motor Performance Outcomes (TEMPO) Lab is where **Joyce Chen**, assistant professor of motor learning, and her team of graduate students study how factors such as aerobic exercise, non-invasive brain stimulation and music can enhance a person's ability to learn motor skills, from putting a golf ball to using their upper limbs again after a stroke.

"My research aims to discover the limits of the brain's plasticity, its ability to change as we learn," says Chen. "Using fundamental and applied research approaches, we want to understand how far we can push motor performance in a musician or athlete, and find ways to enhance the brain's plasticity so that people recovering from a stroke can improve their capacity to move."

Chen's lab is one of many new and renovated research spaces at the Warren Stevens Building (Athletic Centre) and the Goldring Centre for High Performance Sport on the St. George campus, which house most of KPE's research units, labs and centres.

Located in the lower levels of the Warren Stevens Building is the Biomechanics of Orthopaedics and Sports Medicine Lab, run by **Timothy Burkhart**, an assistant professor of orthopaedic biomechanics at KPE, in conjunction with the orthopaedic surgeons of the University of Toronto Orthopaedic Sports Medicine group. Here, athletes simulate game moves that put stress on the hips and knees. Motion-capture technology helps generate computer models that accurately estimate the forces on the hips and knees – a non-invasive way to retrieve data used to require intramuscular probes. And a markerless motion-tracking system videotapes the athletes doing exactly what they would do in their natural environment – for example, playing a game of basketball on a court.



Julia Tom is a professional cellist and a doctoral student of the TEMPO lab, exploring fine motor skills and ways to enhance them.

"The combination of the two techniques – capturing force and movement data in the lab and analyzing videotape of the players on the court – produces an unprecedentedly granular level of analysis," says Burkhart. "What we learn can help both athletes and the everyday healthy population that's relatively active with injury prevention and rehabilitation."

Just down the hall from Burkhart's lab is the Human Physiology Lab, where **Ira Jacobs**, professor of exercise physiology at KPE, and his team of graduate students are exploring how the human body works at the limits of its capabilities and how we can push these limits using novel training and recovery strategies, and nutritional and physiological interventions. "These limits can be related to elite sport training and performance, or to human performance in extreme conditions like altitude, heat and cold," says Jacobs, who is also interim director of the recently founded Tanenbaum Institute for Science in Sport (TISS). Jacobs and his team have also been studying the effects of exercise on the efficacy of prescription drugs.

Back at the Goldring Centre, **Robert Bentley**, assistant professor of cardiovascular physiology, is conducting research into how the heart and blood vessels function during exercise.

"I study the mechanisms of oxygen delivery during exercise and what that means not only for performance but also for exercise tolerance," he says. "My research spans the health spectrum, from basic science investigations in healthy populations to clinical investigations of patients with heart failure and pulmonary hypertension."



One of the machines Bentley uses in his research is the stress echocardiography tilt-recline table ergometer, a specialized bicycle that allows study participants to exercise while the researchers manipulate them by tilting or reclining the bicycle as needed to obtain optimal images of the heart.

“This piece of equipment allows for cardiac imaging to be completed during exercise, which is pretty exceptional,” he says. “If you do not have this special bicycle, individuals often have to exercise on a treadmill or upright bicycle until some criteria is met and then quickly transition themselves onto a table upon which images of the heart can be obtained.”

Bentley’s Cardiovascular Exercise Physiology Lab is housed on the fourth floor of the Goldring Centre, which has been significantly expanded in the recent renovation to provide individual labs and shared research space for a number of faculty. Also located in the Goldring Centre is the Kirkham Lab, led by **Amy Kirkham**, assistant professor of clinical cardiovascular health. The Kirkham Lab uses advanced imaging and lifestyle interventions to understand, treat and improve the health of women with cancer and cardiovascular disease.

Michael Hutchison, associate professor of sport concussion and director of the concussion program at the MacIntosh Sport Medicine Clinic, specializes in sport-related concussion research in various populations, from adolescents to professional athletes.

Daniel Moore, associate professor of muscle physiology, studies the influence of exercise and nutrition on skeletal muscle remodelling and protein metabolism, while **Jenna Gillen**, assistant professor of exercise physiology, conducts research into how exercise and nutrition can alter carbohydrate and fat metabolism in humans.

“We have so many great spaces now available to do in-person research, including an exercise training suite for exercise interventions or training studies and an expanded wet lab that lets us look, on a cellular and molecular level, at how exercise – on its own or in combination with nutrition – influences aspects of metabolic health and physiology,” says Gillen.

“With over 20 research labs housed under KPE, our experts are able to do cutting-edge research in various areas related to physical activity, health and their interactions.”

– Timothy Welsh, professor

A new, more spacious metabolic kitchen is also now available for careful preparation of diet and nutrition interventions for study participants, while blood samples and muscle biopsies are collected for analysis in the procedures room.

“With over 20 research labs housed under KPE, our experts are able to do cutting-edge research in various areas related to physical activity, health and their interactions,” says Professor **Tim Welsh**. The interim associate dean of research at KPE, Welsh is also head of the Action and Attention Lab and studies the cognitive and neural mechanisms behind goal-directed actions of people from average and special populations.

“This tour offered a snapshot of some of the important and far-reaching work that gets done.”

By Jelena Damjanovic
Published online 08/12/2022

Playing Together

Study on Special Olympics Unified Sports explores experiences of students and coaches

Researchers from the University of Toronto's Faculty of Kinesiology and Physical Education collaborated with Special Olympics Ontario to explore perceptions of inclusion among students and coaches in school-based Unified Sports programs.

Unified Sports is an inclusive sport initiative that offers opportunities for students with and without intellectual disabilities to participate on sports teams together.

“Increased social participation positively impacts the well-being of all students.” – Kelly Arbour-Nicitopoulos, associate professor

“The intent of Unified Sports is to provide an inclusive experience by bringing together students with and without intellectual disabilities, but are these experiences truly inclusive? And what does inclusion look and feel like in these sport programs?” says **Kelly Arbour-Nicitopoulos**, an associate professor at KPE and principal investigator of the study. “If the students’ experiences are not fully inclusive, then how can inclusion be better fostered?”

“We explored these questions with some of the athletes and coaches who were participating at the inaugural Invitational Youth Games in May 2019 in Toronto, some of which were hosted at U of T.”

The study, published in *Adapted Physical Activity Quarterly*, found that students’ and coaches’ beliefs and attitudes towards Unified Sports played a key role in the implementation of the sport programming in schools. The coaches specifically influenced the inclusive nature of the teams based on their own understandings of and beliefs around inclusion, such as what roles the students without disabilities have in Unified Sports.

“Which of the student-athletes do the coaches select to take on a leadership role and how exactly are these decisions made?” says **Roxy O’Rourke**, a PhD candidate in Arbour-Nicitopoulos’s ADAPT lab for accessible and inclusive physical activity and first author of the paper. “Are all students provided with the opportunity to play to the best of their abilities on the same team regardless of their experience with disability or not?”

The researchers found that students both with and without intellectual disabilities, as well as the coaches, value the inclusive nature of Unified Sports – in particular, how an inclusive sport program model implemented within the school system can translate to more inclusive practices and behaviours outside of the sport setting. That includes encouraging student groups to mingle at lunchtime and in hallways during breaks.

“Increased social participation positively impacts the well-being of all students,” Arbour-Nicitopoulos says.

The findings also highlight areas for growth and the influential role of coaches, as well as teammates, on sports teams.

“If the idea is to have consistent implementation of programming, then there need to be more evidence-based educational resources outlining these expectations and how to lead and develop Unified Sports programs within the school setting,” says Arbour-Nicitopoulos.

“Some of the language and practices used by participants highlight the need to focus on language choice within the sport environment, and to clearly establish the roles and responsibilities of all athletes and students engaged in the Unified Sports environment.”

The researchers suggest future studies should explore training for coaches on inclusive practices – for example, the language used in the sports environment when working with individuals with and without disabilities.

This study was funded by a grant from Special Olympics Canada and co-authored by **Krystn Orr**, a PhD graduate from the ADAPT lab; Rebecca Renwick, a professor in the Department of Occupational Science and Occupational Therapy in the Temerty Faculty of Medicine; Virginia Wright, a registered physiotherapist and senior scientist at the Bloorview Research Institute (BRI) and professor in the Department of Physical Therapy and Rehabilitation Sciences Institute in the Temerty Faculty of Medicine; James Noronha, a senior consultant at Special Olympics Ontario; and Kirsten Bobbie, manager of games and competitions at Special Olympics Canada.

By Jelena Damjanovic
Published online 25/04/2023

SPORT, PEACE AND POLITICS

Sport's peacebuilding power stems not from a mythical ability to transcend conflict, but from engagement with the tricky politics of peace

The relationship between sport and the pursuit of peace is at once an inspiring and a cautionary tale. In 1914, sport contributed to a fleeting “Christmas Truce” during World War One, when British and German soldiers crossed the trenches of the Western Front for an impromptu game of football. In 1995, the South African national rugby team – inspired by new President Nelson Mandela – hosted and won the Rugby World Cup, playing in the tournament for the first time since the end of apartheid and demonstrating a role for sport in national reconciliation and healing. And in 2013, the United Nations named April 6 as the annual International Day of Sport for Development and Peace, commemorating the first modern Olympic Games in Athens in 1896, and calling on sport to contribute to peace and reconciliation on a global scale.

And yet, sport also has a rather dubious record in relation to peace. In 1969, the 100 Hour War between El Salvador and Honduras, also known as the Football War, started after riots during a World Cup qualifying match between the two countries ignited existing tensions. A riot between supporters of Dinamo Zagreb and Red Star Belgrade in 1990 took place on the eve of the violent break-up of Yugoslavia and helped to foment the war that was to come. And more recently, athletes who've used sport as a platform to speak out against racism and police violence have found themselves vilified by fans, reporters and politicians, suggesting that at some level, sport has failed to provide a platform that unites people around peace and understanding. These examples hearken back to George Orwell's infamous quotation that serious sport is “war minus the shooting.”

So, what does this rather checkered past tell us about sport and its potential to contribute to peace, conflict resolution or universal understanding today?

Can we reasonably expect sport to make the world a more peaceful place?

First, there is the question of what sport offers in and to a globalized and interconnected world. It's worth reflecting on the fact that sport is undoubtedly a globally recognized cultural form. The FIFA World Cup final, for example, remains the world's most-watched broadcast event and, around the world, people engage in sports and physical cultural activities in ways that transcend language, geography or social class. This suggests that there is at least an opportunity to unite people around the common interest that global sport provides.

However, sport is not a replacement for the often-messy politicking, and the deeply human activities, that are necessary to achieve peace. The case of Mandela and the 1995 Rugby World Cup is instructive here. Whereas the popular narrative of the event, constructed through Hollywood films like *Invictus*, often give credit to the unifying power of sport for healing South Africa's divisive racial history, a more accurate reading is that peace through sport was possible because, at every turn, Mandela resisted the calls and opportunities to descend into a race-based civil war and instead chose to pursue a politics of reconciliation and forgiveness.

Without doubt, sport and the '95 World Cup were well positioned to support his approach, and Mandela leveraged rugby brilliantly. But the real work was the struggle to let go of the pain and violence of apartheid in the name of healing.

That Mandela led this process with grace and conviction cannot, and should not, be reduced to or explained away as simply exemplary of the “power of sport.” This importance of humanizing the relationship between peace and sport

“It is only when the world of sport, and the leaders of sport, are willing and able to engage politically that sport’s peace potential might be realized.”

remains today, even though Mandela himself stated that “Sport has the power to change the world. It has the power to inspire. It has the power to unite people in a way that little else does.”

A third implication, then, is that sport’s potential contributions to peace and reconciliation do not emerge from, or rest in, its apolitical position or mythical transcendence of violence and conflict. Indeed, one only needs to think again of Orwell, or of the current popularity of mixed martial arts, or the fundamental violence of sports like American football to reject the thesis that sport somehow exists beyond the realm of violence.

Instead, it is only when the world of sport, and the leaders of sport, are willing and able to engage politically that sport’s peace potential might be realized.

Stepping up from the political sidelines

This is, admittedly, an unpopular perspective in that it stands at odds with the unyielding efforts of major sporting stakeholders, most notably the International Olympic Committee (IOC), to steer sport clear of politics. A most recent example of this is the IOC’s Rule 50, designed to prevent political demonstration by Olympic athletes during the Games – a policy with clear historical reference to John Carlos and Tommie Smith’s gloved-fist salute on the Olympic podium at the 1968 games in Mexico City in support of the Olympic Project for Human Rights.

Instead of contributing to peace, policies like Rule 50 are a fool’s errand, for several reasons. The first is that attempting to implement rules to prevent social and political activism in sport completely misreads the fact that activists – whether athletes or not – are largely unconcerned with following conventions. Indeed, that is what makes them activists! Second is that audiences, both sports fans and non-sports fans alike, remain deeply interested in what athletes have to say on political matters, even if they disagree.

So, even though athletes such as American footballer Colin Kaepernick – who, in 2016, was the first athlete to take the knee – have faced significant backlash for protesting against racism, it is also the case that his efforts, and those of others around the world, have served to solidify and advance social movements such as Black Lives Matter.

While the peaceful outcomes of these efforts might not be immediately visible today, recognizing that the long arc of morality bends towards justice means that sport and athletes are laying the groundwork now for peace and social change that is to come. This can only happen, however, when sporting organizations are willing and able to suspend their financial and branding interests when presented with the challenge of organizing sport in the struggle for peace. The recent expulsion of Russian sport from most international sporting competitions in response to the invasion of Ukraine is encouraging; the tacit acceptance by the global sporting community of China’s ethnic cleansing of the Rohingya minority during the 2022 Beijing Olympics is less so.

What is called for, then, and sorely needed in these times of military aggression, climate emergency and the ongoing fallout of a global pandemic, are organizations, policies and leaders within sport that support a strong, ethical and direct engagement with the political struggle for peace and justice. Attempts by sport leaders to bury their heads in the sand of neutrality will only allow conflict to continue, while exposing the complicity of sport with injustice and inequality, and making hypocrites of those who enjoy expounding on sport’s peaceful foundations.

Worse, a failure on the part of sport leaders to engage with the politics of peace will render moot the powerful potential that global sport and celebrity athletes actually hold to make a positive contribution. Given the crises that the Earth is facing, the time is now for sports to get off the political sideline and get into the game of pursuing peace and justice.

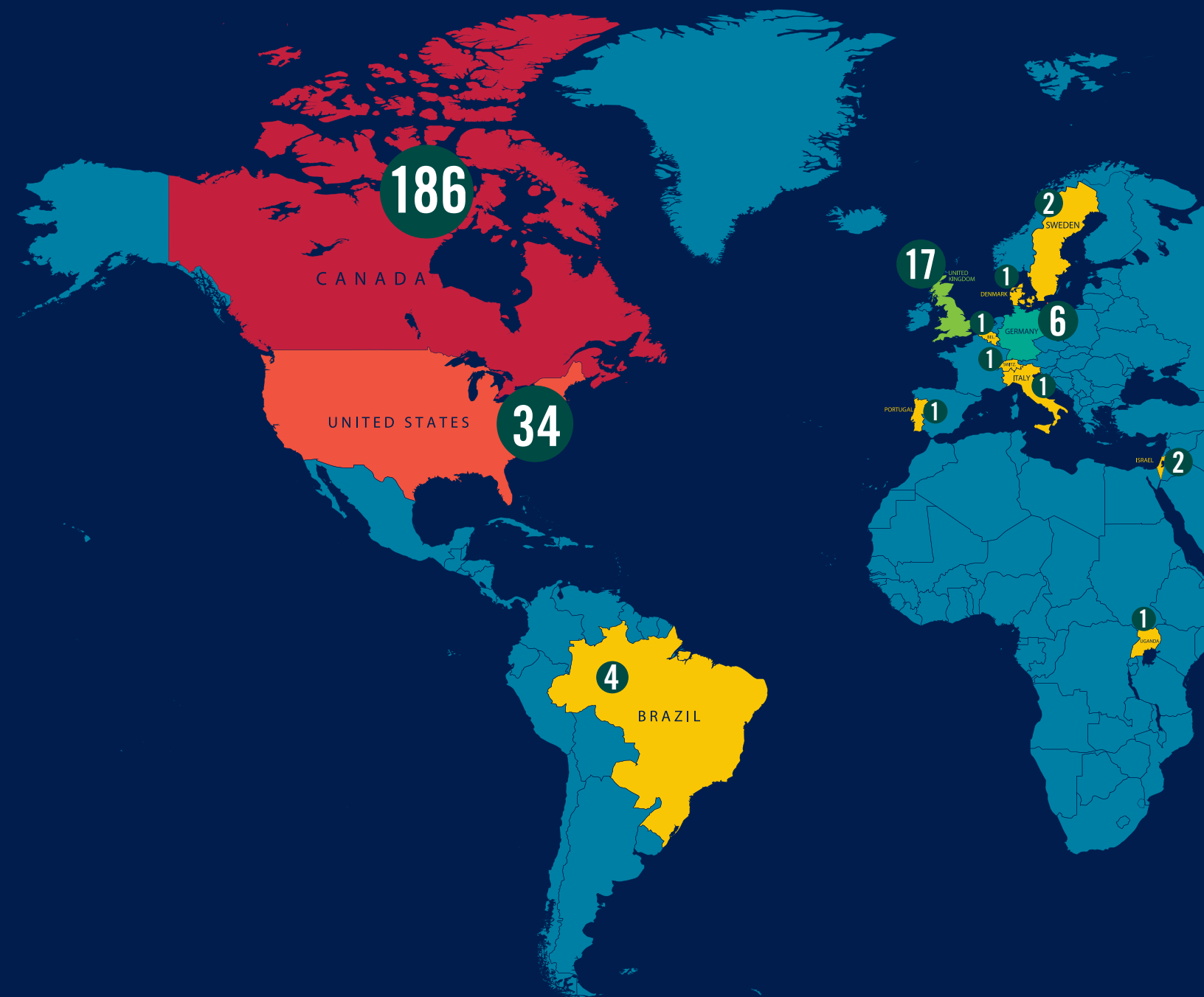
Simon Darnell is associate professor for sport for development and peace and director of the Centre for Sport Policy Studies at KPE.

By Simon Darnell
Originally published by [The ACU Review](#) 13/07/2022

<https://www.acu.ac.uk/the-acu-review/sport-peace-and-politics/>

International Collaborations

A look at our global research networks



Our researchers have generated new knowledge with academics from around the world. This map shows the number of academics in each country who have contributed to the publications of our researchers.



- Australia 17
- Bangladesh 1
- Belarus 1
- Brazil 4
- Canada 186
- Denmark 1
- Germany 6
- Hong Kong 1
- Israel 2
- Italy 1
- Japan 2
- New Zealand 1
- Portugal 1
- Sweden 2
- Switzerland 1
- Taiwan 2
- Uganda 1
- United Kingdom 17
- United States 34

KPE RESEARCH FUNDING (2022–2023)

Primary Investigator	Sponsor	Research Project Title	Funding Type	Amount
Kelly Arbour-Nicitopoulos	Canadian Tire Jumpstart	The National Physical Activity Measurement Project for Children and Youth with Disabilities	Not-for-Profit Sector	\$40,500
Kelly Arbour-Nicitopoulos	SSHRC	A[head] of the Game: An Exploration of Athletes' Experiences and Coach–Athlete Conversations of Mental Health/Illness	Tri-Agency	\$125
Robert Bentley	NSERC	Measuring Active Muscle Oxygenation and Blood Flow Non-invasively during Dynamic Physical Activity	Tri-Agency	\$150,000
Robert Bentley	NSERC	Mechanisms of Phenotypic Variance in Cardiovascular Responses to Exercise	Tri-Agency	\$33,000 + \$12,500
Timothy Burkhart	Connaught Fund	The Role of Lower Extremity Muscular Fatigue on Muscle Force Development and Lower Extremity Kinematics: A Model for ACL Injury Risk and Return to Activity	Not-for-Profit Sector	\$20,000
Timothy Burkhart	NSERC	Contributions of Lower Extremity Musculature to Hip and Knee Joint Co-ordination, Stability, and Regional Tissue Mechanics	Tri-Agency	\$32,000
Timothy Burkhart	NSERC	Markerless Motion Tracking for Synchronized Quantification of Joint Kinematics, Forces and Muscle Activation Patterns	Tri-Agency	\$112,179
Simon Darnell	Canadian Heritage	Greening the Sport Sector in Canada: Strengthening Our Knowledge of Canada's Sport Ecology to Inform the Development of an Action Plan	Government, Other	\$39,000
Simon Darnell	Sport Dispute Resolution Centre of Canada	Fostering a Positive, Safe and Brave Culture for Youth in Sport	Government, Other	\$29,810
Jenna Gillen	Dairy Farmers of Canada	Influence of Post-Exercise Greek Yogurt Consumption on 24-Hour Glycemic Control in Women with Overweight/Obesity – A Crossover Study	Private Sector	\$55,520
Jenna Gillen	NSERC	Regulation of Human Skeletal Muscle Glucose Metabolism in Response to Exercise	Tri-Agency	\$33,000
Michael Hutchison	Public Health Agency of Canada	Understanding Concussion: From Injury to Return-to-Action	Government, Other	\$37,163
Janelle Joseph	Canada West Universities Athletic Association	Canada West Universities Athletic Association Anti-Racism and Equity in University Sport	Not-for-Profit Sector	\$25,000
Janelle Joseph	Ontario Colleges Athletic Association	Ontario Colleges Athletic Association Racial Equity Project	Not-for-Profit Sector	\$25,000
Janelle Joseph	SSHRC	Anti-Black Racism and Equity Efforts in Canadian University Sports	Tri-Agency	\$46,667
Gretchen Kerr	Canadian Centre for Ethics in Sport	Athlete Perspectives and Experiences of Competitive Fairness	Not-for-Profit Sector	\$4,666
Gretchen Kerr	Coaching Association of Canada	Addressing and Preventing Gender-Based Violence through Sport	Not-for-Profit Sector	\$74,640
Gretchen Kerr	Silver Gummy Foundation	Gender-Based Violence in Sport	Not-for-Profit Sector	\$82,283
Amy Kirkham	CIHR	A Novel Remote Intervention to Decelerate the Age-Related Decline and Disease Development among Older Breast Cancer Survivors	Tri-Agency	\$100,000

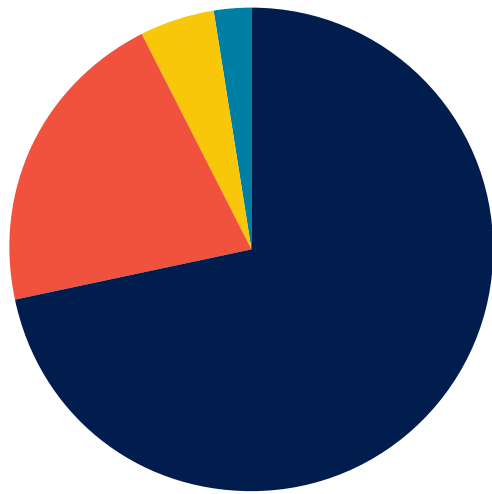
Note: Reported above are all installments for operating grants received from April 1, 2022 to March 31, 2023. Source: U of T Dashboard, Funds by Sponsor.

KPE RESEARCH FUNDING (2022–2023)

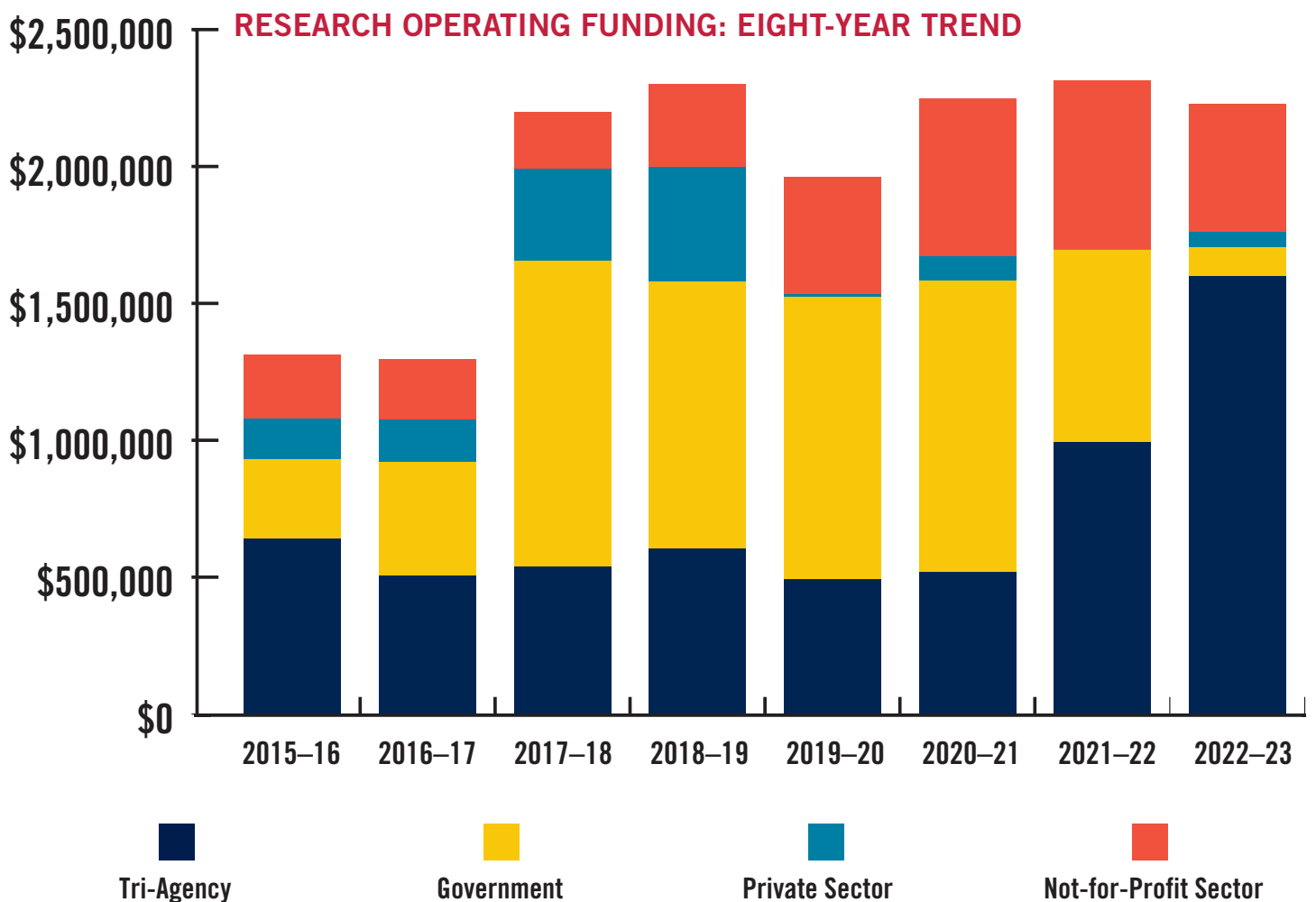
Primary Investigator	Sponsor	Research Project Title	Funding Type	Amount
Amy Kirkham	CIHR	Quantifying the Cardiovascular and Metabolic Health Benefits of Canada's Physical Activity and Healthful Eating Guidelines on Pre- and Postmenopausal Women	Tri-Agency	\$100,000
Amy Kirkham	CIHR (sub-grant from University of Alberta)	Quantitative Imaging of the Evolution of the Whole-Body Fat Profile in Breast Cancer Survivors	Tri-Agency	\$170,252
Amy Kirkham	Diabetes Canada	The Impact of Time-Restricted Eating Window Timing, Type 2 Diabetes Status and Sex on Glycemic Control	Not-for-Profit Sector	\$100,000
Amy Kirkham	Heart and Stroke Foundation	Characterizing and Treating the Unique Cardiovascular Needs of Women with Cancer	Not-for-Profit Sector	\$60,000
Dinesh Kumbhare	NSERC	Mechanisms of Neuroplasticity	Tri-Agency	\$32,000
Catherine Sabiston	CRC – CIHR	Canada Research Chair (Tier II) in Physical Activity and Mental Health	Tri-Agency	\$100,000
Catherine Sabiston	New Frontiers in Research Fund	Exploration of the Mechanisms and Impacts of Body Image in Virtual Reality	Tri-Agency	\$125,000
Catherine Sabiston	SSHRC	Body Surveillance and Body-Related Self-Conscious Emotions, and Deficits in Cognitive and Motor Performance	Tri-Agency	\$57,740
Catherine Sabiston	SSHRC	Partnership for Equitable, Diverse and Inclusive Participation, Access and Quality Experiences in Youth Sport (Sport4All)	Tri-Agency	\$19,750
Daniel Santa Mina	Canadian Cancer Society (sub-grant from University of Calgary)	EXCEL: Exercise for Cancer to Enhance Living Well	Not-for-Profit Sector	\$35,000
Katherine Tamminen	SSHRC	Improving Emotion Dysregulation and Psychosocial Functioning among Competitive Athletes	Tri-Agency	\$24,706
Katherine Tamminen	SSHRC	Interpersonal Emotion Regulation in Sport	Tri-Agency	\$14,728
Luc Tremblay	NSERC	Modulation in the Use of Multisensory Information during Voluntary Action	Tri-Agency	\$56,000
Linda Trinh	CIHR	RiseTx: A mHealth Intervention for Reducing Sedentary Behaviour among Prostate Cancer Survivors	Tri-Agency	\$252,450
Tim Welsh	NSERC	The Planning and Control of Movements in Social Contexts	Tri-Agency	\$39,000
Tim Welsh	SSHRC	Are Two Better Than One? Assessing the Learning and Motivational Benefits of Practicing in Pairs	Tri-Agency	\$40,307
Tim Welsh	SSHRC	The "Cheerleader Effect" in Body Size Judgements	Tri-Agency	\$2,374
Tim Welsh	SSHRC (sub-grant from Toronto Metropolitan University)	Planning and Control of Actions in Unmediated, Augmented and Virtual Environments	Tri-Agency	\$45,000

Note: Reported above are all installments for operating grants received from April 1, 2022 to March 31, 2023. Source: U of T Dashboard, Funds by Sponsor.

Research Funding by Year



2022-2023 FUNDING BY SPONSOR	
Tri-Agency	\$1,598,779
Not-for-Profit	\$467,090
Government	\$105,974
Private Sector	\$55,520
TOTAL	\$2,227,363



Note: Reported above are all installments for operating grants received from April 1, 2022 to March 31, 2023. Source: U of T Dashboard, Funds by Sponsor.

PUBLICATIONS (2022–2023)

This list is presented in alphabetical order by first-listed author. It does not include accepted or in-press publications.

Peer-Reviewed Articles (157)

Abdulrabba, S., **Tremblay, L.**, & Manson, G. A. (2022). Investigating the online control of goal-directed actions to a tactile target on the body. *Experimental Brain Research*, 240, 2773–2782. <https://doi.org/10.1007/s00221-022-06445-0>

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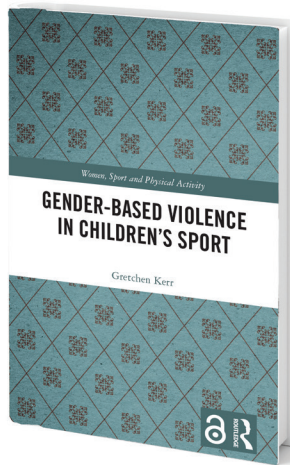
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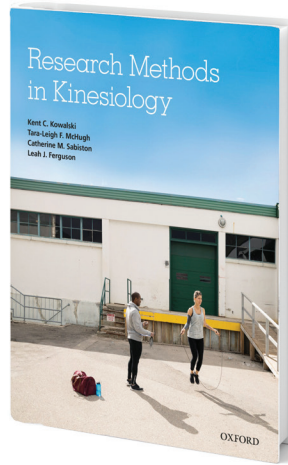
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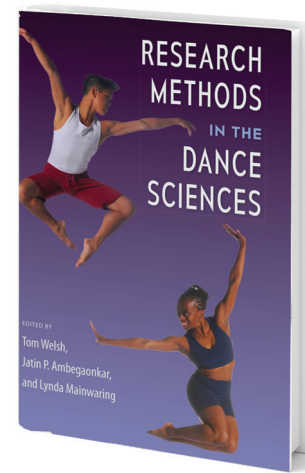
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